

Nashville, New Orleans, Pittsburgh and Yankton; 97°, Fort Gibson, Indianola, St. Louis and Wilmington; 98°, Salt Lake City, Smithville and Washington; 99°, Denver, Fort Sill, Norfolk, Omaha, St. Marks, Tybee Island, Vicksburg; 100°, Augusta, Charleston, Concho, Denison, Jacksonville, Mason, Mobile and Savannah; 101°, Dodge City; 102°, Corsicana and Montgomery; 103°, Sacramento; 104°, Laredo and Winnemucca; 106°, Brackettville and Boise City, Idaho; 107°, North Platte; 109°, Fort Sully and Rio Grande; 112°, Maricopa Wells; 113°, Yuma. Minimum temperatures below 40°: 23°, Pike's Peak; 34°, Mt. Washington; 37°, Winnemucca; 38°, Virginia City. The maximum temperatures for the month may be divided into three periods, the first of which occurred from the 4th to the 8th, and was generally distributed over the country to the southwest of a line drawn from North Carolina to Minnesota; the second occurred from the 15th to the 18th over the Lake region, Upper Ohio valley and Maine; and the third from the 25th to the 30th in the Atlantic coast States, Lower Lake region and lower Michigan.

*Ranges of Temperature.*—The largest diurnal ranges have been: 36° at Yankton and 38° at Pembina, 28th; 39° at Breckenridge, 29th, and Sacramento, 7th; 42° at Brackettville, 22d; 54° at Winnemucca, 28th.

*The largest monthly ranges* have been: 51°, Detroit, Dodge City and Sacramento; 52°, Yankton and Stockton; 53°, Cheyenne; 55°, Brackettville and Maricopa Wells; 61°, Fort Sully; 62°, North Platte; 65°, Campo; 67°, Winnemucca.

*Frosts* were observed as follows: 30th and 31st, Camp Halleck, Nev.; 31st, Coalville, Utah, killing tender vegetation. Frosts at Summit, Col., nightly.

*Ice.*—The formation of ice, rather than frosts, was reported from Fort Sanders, Wy. Ty., on the 31st. Ice at Summit, Col., quarter of an inch thick night of July 31st and August 1st.

## PRECIPITATION.

*In General.*—The general distribution of rain for the month is shown on chart No. III. The region of heaviest rain-fall is seen to extend along the East Gulf, South and Middle Atlantic coasts, while over the entire country east of the 100th meridian the rain-fall has been quite evenly distributed. Areas of light rain-fall are, however, seen to exist in the interior of South Carolina and Georgia; in Texas and Indian Territory; in lower Michigan and Canada; and from eastern Iowa westward. Rains have fallen at almost all stations situated in the Rocky Mountain region and along the Pacific coast, but the amounts reported are generally quite small. The table of comparative values, given on chart No. III, shows the rain-fall to be near the normal in nearly all the districts, excepting in the Middle and South Atlantic States, where an excess of one inch and a quarter is reported, and in the St. Lawrence valley, where a deficiency of about three-fourths of an inch is reported.

*Special Heavy Rains.*—The following are the most notable cases of heavy rains that have been reported 1st, North Volney, N. Y., 2.90 inches; Biddeford, Me., 8 inches in 3 hours; New London, Conn., 1.15 in 2½ hours; Oswego, N. Y., 3.57 in.; Utica, N. Y., heaviest rain-fall for years. 5th, Breckenridge, Minn., 2.02 inches in 1½ hours. 7th, Marquette, Mich., 1 inch in 30 minutes. Breckenridge, Minn., 2.00 in. in about 20 minutes during a hurricane. 8th, La Crosse, Wis., 2.69. 10th, Sandy Springs, Md., 0.60 inch fell in 15 minutes; Savannah, Ga., 2.80 in 4½ hours. 15th, Guttenburg, Iowa, 2.02 inches fell in 35 minutes; Cleveland, Tenn., 3.1 inches fell in 1 hour 20 minutes. 16th, Alpena, Mich., 1.36 in.; Brackettville, Tex., 2.49 in.; Merom, Ind., 5.91 inches. 17th, Independence, Kan., 3.37 inches. 18th, Ft. Sill, Ind. Ter., 1.74 in.; Louisville, Ky., 2.64 in. 20th, Atlantic City, 2.14 in.; 20th, 21st and 22d, Cape Lookout, N. C. 5.69 in.; Cape Hatteras, 6.01 in.; Charleston, 7.33 in.; Wilmington, N. C., 6.87. 24th, Baltimore, 1.28 in 1 hour. 26th, Ft. Sill, Ind. Ter., 1.97 in. Rochester, N. Y., 2.05 in. 29th, Ft. Whipple, Va., 2.34. 30th, Trenton, N. J., 1.00 inch fell in 40 minutes; Hulmeville, Pa., 1.15 inch fell in 35 minutes; Bismarck, Dak. Ter., 0.45 in. in 30 minutes; 31st, Iowa City, Iowa, 2.50 inches fell in 1 hour.

*Small Monthly Rain-falls.*—The following stations report less than 0.5 of an inch: in California, Arizona and the Rocky Mountain region; San Francisco, .02; Sacramento and San Diego, .00; Wickenburg, .18; Stanwix, .13; Winnemucca, .27; Salt Lake City and Fort Fred Steele, .08; Cheyenne, .43; Denver, .33.

*Large Monthly Rain-falls.*—Rain-falls to the amount of seven inches or more were reported as follows: Cape Lookout, 8.78; Charleston, 10.21; Keokuk, 7.06; Mt. Washington, 11.27; Norfolk, 7.97; St. Marks, 8.72; Wilmington, 9.35; Cape Hatteras, 9.80; Milford, Del., 7.90; St. Mary's, Ga., 7.65; Milford, Ind., 7.69; New Orleans, 7.50; Trenton, N. J., 7.40; Vineland, N. J., 7.12; Moorestown, N. J., 7.43; Goldsboro, N. C., 7.56; Weldon, N. C., 7.76; Attaway Hill, N. C., 7.18; Hulmeville, Penn., 9.38; Cleveland, Tenn., 7.90; Prospect Hill, Va., 8.90; Utica, Wis., 8.30.

*Droughts.*—Droughts, injurious to vegetation, have been reported as follows: Illinois—Carbondale,

drought during the month; Anna, on the 11th, relieved by subsequent rains. Massachusetts—Waltham, drought towards end of month. Texas—Clarksville, drought during month injurious to cotton and late corn; Deason, corn, cotton and vegetables suffering greatly; Pilot Point, 16th, vegetation drying up for want of rain, relieved by heavy thunder-storm on the 18th. Virginia—Wytheville, drought ended on the 16th. Iowa—Ndm Springs, latter part of month corn and potatoes suffering. Wisconsin—Waupesa, during month wells failing, brooks drying up, swamps dry, crops damaged; hay, half crop; wheat (and oats) half to three-quarters of a crop; potatoes, small amount, no wild fruits, no apples. Dakota—Olive, 15th. Ohio—Cleveland, 9th.

*Hail-storms.*—Hail-storms have been reported as follows: 1st, Kan., Conn., Md., N. Y., N. J., Ill.; Dak., Pa.; 2nd, Va., N. C., Ill., Kan.; 3rd, Del., N. Y., Pa.; 5th, N. Y., Fla., Ind., N. J., Ohio, Vt., Va., Ga., Dak., Pa., Pembina, D. T.; 7th, Mich.; 8th, Wyoming Tër., Iowa, N. M.; 9th, Conn.; 10th, Wy. Tër., Me., Ind.; 11th, Texas; 13th, N. J., N. M.; 15th, N. C.; 17th, Kans.; 21st, Col.; 22nd, Va., N. M.; 24th, Wy. Tër.; 25th, Col.; 26th, Col., Md., Dak.; 27th, Pa., Dak.; 28th, N. Y.; 29th, N. M.; 30th, N. Y., Dak.

*Largest hail-stones.*—1st, Conn., Southington, 1 inch in diameter; N. Y., Farmingdale, size of pigeon's eggs; N. J., Barnegat, 3 inches in circumference; Westown, stones  $\frac{1}{2}$  to 1 $\frac{1}{2}$  inches in diameter; path of storm, 1000 yards wide; course, N. E. by N.; depth of hail,  $\frac{1}{2}$  to 5 inches; destroyed all vegetable growth, killed one cow, several pigs and chickens, &c. 2nd, Ashfield, N. C., stones as large as pigeon's eggs. 3d, Florida, Mayport,  $\frac{1}{2}$  inch in diameter; N. Y., Adams, 2 $\frac{1}{2}$  inches in diameter. 5th, Ft. Rice, D. T., 3 inches in diameter; Ohio, Murristown, as large as hen's eggs. 7th, Mich., Marquette, one hail-stone measured nine inches in circumference—most were nearly egg-shaped. 6th, N. Y., Rodman, 9 inches in circumference. 13th, N. J., Atlantic City,  $\frac{1}{2}$  inch in diameter. 15th, N. C., Greenville, as large as pigeon's eggs. 22nd, Santa Fe, as large as pigeon's eggs. 30th, on the Yellowstone, as large as a man's clenched hand, perforating the tepees of the Crow Indians and killing a large number of ponies; at Bismarck, stones as large as pigeon's eggs.

*Snow.*—The 4th, at Summit, Col., was celebrated by a snow-ball party, on snow shoes, which afterward resolved itself into a flower-gathering party, the situation admitting of persons standing on the snow three feet deep, and picking a large variety of Alpine flowers from the uncovered ground beyond the snow. On the 27th, 28th and 29th, snow fell at Pike's Peak.

*Rainy days.*—The number of days on which rain has fallen, as recorded by Signal Service observers, ranges as follows: New England, 10 to 20 days; Middle Atlantic, 13 to 18; South Atlantic, 9 to 14; East Gulf, 8 to 14; West Gulf, 7 to 13; Tennessee and Ohio valley, 10 to 18; Lower Missouri valley, 6 to 14; Upper Mississippi valley, 8 to 10; Upper Lake region, 10 to 18; Lower Lake region, 10 to 14; Rocky Mountain stations, 1 to 19; California, 0 to 1; Oregon, 5.

*Cloudy days.*—The number of cloudy days reported during the month by Voluntary Observers and Army Sergeants ranges about as follows: New England, 6 to 19 days; Middle Atlantic States, 5 to 20 days; South Atlantic States, 3 to 14 days; East Gulf States, 3 to 5 days; West Gulf States, 2 to 16 days; Tennessee and Ohio valley, 5 to 13 days; Lower Missouri valley, 2 to 23 days; Upper Mississippi valley, 2 to 6 days; Lake region, 2 to 22 days.

*Rain from a cloudless sky* was observed at Bangor, Me., on the 17th.

## RELATIVE HUMIDITY.

The average relative humidity for the month ranges about as follows: New England, 65 to 85; Middle Atlantic States, 58 to 86; South Atlantic States, 65 to 78; East Gulf States, 62 to 79; West Gulf States, 65 to 70; Tennessee and Ohio valley, 67 to 70; Lower Missouri valley, 62 to 68; Upper Mississippi valley, 62 to 69; Upper Lakes, 62 to 72; Lower Lakes, 61 to 70; San Diego, 74. High stations, uncorrected for altitude, report as follows: Mt. Washington, 86; North Platte, 47; Cheyenne, 31; Denver, 32.

## WINDS.

*In General.*—The prevailing winds at Signal Service stations are shown by arrows on chart No. II, from which it will be seen that southerly winds greatly predominated, tending to southeast west of the Mississippi; and to southwest along the Atlantic coast and Lake region.

*Total Movements.*—The largest total movements are as follows: Mt. Washington, 14,903 miles; Cape Lookout, 12,022; North Platte, 11,145; Pike's Peak, 11,090; Cape Hatteras, 10,176; Kittyhawk, 9,619; Breckenridge, 9,431.

*The Smallest Movements* are: Shreveport, 1,880; Nashville, 2,707; Augusta, 2,132; Lynchburg, 2,440.

*The Highest Velocities*, in miles per hour, have been: 1st, Sandy Hook, 73; 2nd, Pike's Peak, 50; 19th, Cape Lookout, 60; 25th, Mt. Washington, 65; 28th, Washington, D. C., 60; 30th, North Platte, 84 miles.